User Manual

Tektronix

P7225
2.5 GHz 10X Active Probe

071-1187-01

Warning
The servicing instructions are for use by qualified personnel only. To avoid personal injury, do not perform any servicing unless you are qualified to do so. Refer to all safety summaries prior to performing service.

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Tektronix warrants that the systems that it manufactures and sells, (excluding customer-supplied equipment), will be free from defects in materials and workmanship for a period of one (1) year. The warranty period shall begin on the date of installation or one (1) month after the date of shipment, whichever is earlier. If any component of a system supplied by Tektronix proves defective during the initial one-year period, Tektronix, at its option, either will repair the defective component without charge for parts and labor, or will provide a replacement in exchange for the defective component. If any component of the system is a Tektronix product that is normally sold with a separate warranty, such separate warranty will apply to the component whenever its terms are more favorable to the Customer.

In order to obtain service under this warranty, Customer must notify Tektronix of the defect before the expiration of the respective warranty period and make suitable arrangements for the performance of service. Tektronix will provide such service at Customer's site without charge during the warranty period, if the service is performed within the normal on-site service area. Tektronix will provide on-site service outside the normal on-site service area only upon prior agreement and subject to payment of all travel expenses by Customer. When or where on-site service is not available, Customer shall be responsible for packaging and shipping the defective component to the service center designated by Tektronix, with shipping charges prepaid. Tektronix shall pay for the return of the component to Customer if the shipment is to a location within the country in which the Tektronix service center is located. Customer shall be responsible for paying all shipping charges, duties, taxes, and any other charges for components returned to any other locations.

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General Safety Summary

Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it. To avoid potential hazards, use this product only as specified.

Only qualified personnel should perform service procedures.

To Avoid Fire or Personal Injury

Connect and Disconnect Properly. Connect the probe output to the measurement instrument before connecting the probe to the circuit under test. Disconnect the probe input and the probe ground from the circuit under test before disconnecting the probe from the measurement instrument.

Observe All Terminal Ratings. To avoid fire or shock hazard, observe all ratings and markings on the product. Consult the product manual for further ratings information before making connections to the product.

Connect the ground lead of the probe to earth ground only.

Do Not Operate Without Covers. Do not operate this product with covers or panels removed.

Do Not Operate With Suspected Failures. If you suspect there is damage to this product, have it inspected by qualified service personnel.

Do Not Operate in Wet/Damp Conditions.

Do Not Operate in an Explosive Atmosphere.

Keep Product Surfaces Clean and Dry.

Safety Terms and Symbols

Terms in This Manual. These terms may appear in this manual:

WARNING. *Warning statements identify conditions or practices that could result in injury or loss of life.*

CAUTION. *Caution statements identify conditions or practices that could result in damage to this product or other property.*

Terms on the Product. These terms may appear on the product:

DANGER indicates an injury hazard immediately accessible as you read the marking.

WARNING indicates an injury hazard not immediately accessible as you read the marking.

CAUTION indicates a hazard to property including the product.

Symbols on the Product. These symbols may appear on the product:

CAUTION
Refer to Manual

Preface

This is the User Manual for the P7225 probe. This manual provides operating information, specifications, and a replaceable parts list.

Related Manuals

If you need to do a performance verification or make internal adjustments to your probe, refer to the *P7225 2.5 GHz Active Probe Service Manual*. The manual is a printable pdf file, and is available on both the Tektronix website and the Optional Applications CD. The Optional Applications CD is included with Tektronix instruments featuring the TekConnect interface.

Contacting Tektronix

Phone	1-800-833-9200*
Address	Tektronix, Inc. Department or name (if known) 14200 SW Karl Braun Drive P.O. Box 500 Beaverton, OR 97077 USA
Web site	www.tektronix.com
Sales support	1-800-833-9200, select option 1*
Service support	1-800-833-9200, select option 2*
Technical support	Email: techsupport@tektronix.com 1-800-833-9200, select option 3* 1-503-627-2400 6:00 a.m. – 5:00 p.m. Pacific time

*** This phone number is toll free in North America. After office hours, please leave a voice mail message.**
Outside North America, contact a Tektronix sales office or distributor; see the Tektronix web site for a list of offices.

Product Description

The Tektronix P7225 is a 2.5 GHz, 10X active probe. The P7225 has a ≤0.8 pF input capacitance and a high input resistance (40 kΩ), to minimize circuit loading over the specified bandwidth. The small profile and low-mass head of the P7225 make probing dense circuitry by hand fast and easy. The accessory tips and adapters included enable the P7225 to be used on a wide variety of circuit architectures.

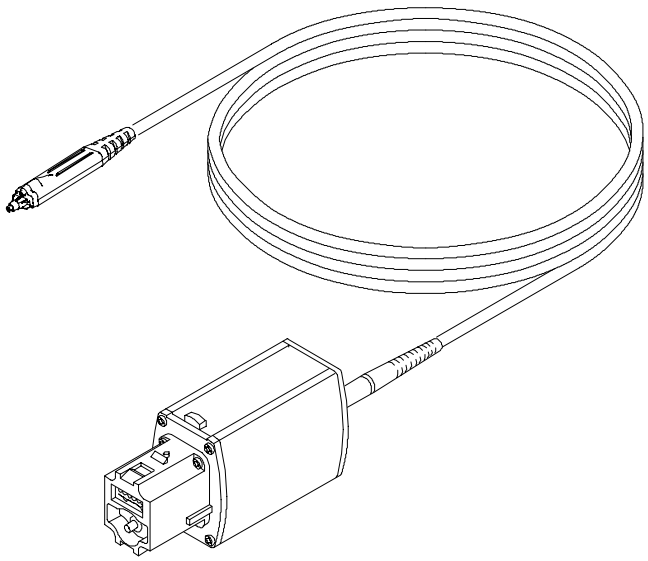


Figure 1: P7225 Probe featuring the TekConnect Interface

TekConnect Interface

The P7225 is powered through a TekConnect Interface between the probe compensation box and the host instrument. The TekConnect Interface provides a communication path through contact pins on the host instrument. Power, signal, offset, and probe characteristic data transfer through the interface.

When the probe is connected, the host instrument reads EEPROM information from the probe, identifying the device and allowing the appropriate power supplies to be powered on. The preamp inputs on the host instrument are electrostatic discharge protected by remaining grounded until a valid TekConnect device is detected.

Installation

The TekConnect Interface features a spring-loaded latch that provides audible and tactile confirmation that a reliable connection has been made to the host instrument. Slide the probe into the TekConnect receptacle on the host instrument. The probe snaps into the host instrument when fully engaged. See Figure 2.

To release the probe from the host instrument, grasp the compensation box, depress the latch button, and pull out the probe.

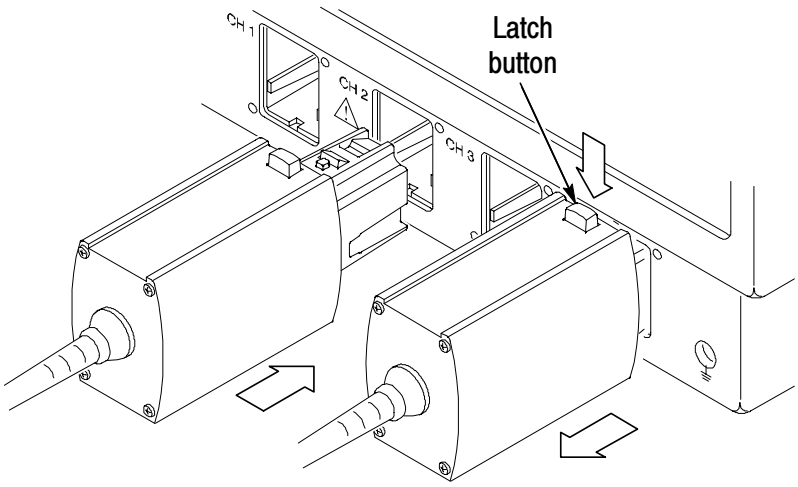


Figure 2: Connecting and disconnecting the probe

Options

The following options are available when ordering the P7225 probe:

- Option D1 — Calibration Data Report
- Option C3 — 3 years Calibration Service
- Option D3 — 3 years Calibration Data Report (requires Option C3)
- Option R3 — 3 years Repair Service
- Option C5 — 5 years Calibration Service
- Option D5 — 5 years Calibration Data Report (requires Option C5)
- Option R5 — 5 years Repair Service

Features and Accessories

The P7225 is provided with several features and accessories designed to make probing and measurement a simpler task. To familiarize yourself with these items and their uses, refer to Table 1.

WARNING. *To avoid injury, use care when handling accessories with sharp tips.*

Table 1: P7225 features and standard accessories

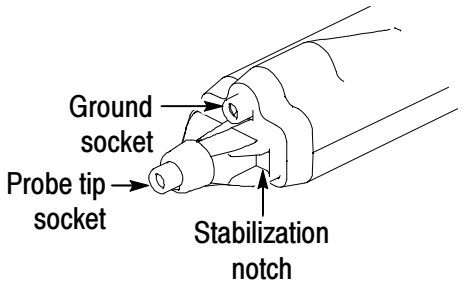
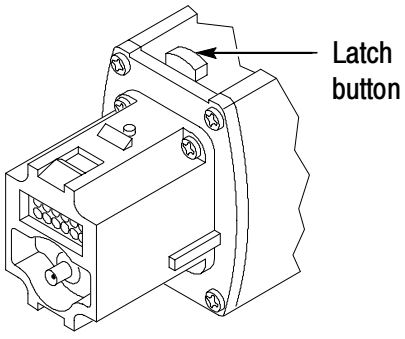
Feature/Accessory	Description
	**Probe head assembly.** The probe head is designed for ease of use and high performance. The small size makes it easy to handle in tight areas. The probe tip socket is sized to easily press onto 0.025 inch square pins for direct access. The ground socket provides a short ground path for high-fidelity ground connections. The stabilization notch permits you to use adjacent pins to reduce stress on the probe and pins.
	**TekConnect Interface.** The TekConnect Interface provides a communication path between the probe and the host instrument. Contact pins provide power, signal, offset, and probe characteristic data transfer. The probe snaps into the host instrument when fully engaged. To remove, grasp the compensation box, depress the latch button, and pull the probe out.

Table 1: P7225 features and standard accessories (Cont.)

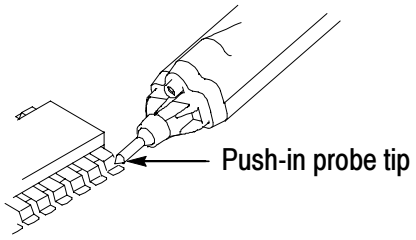
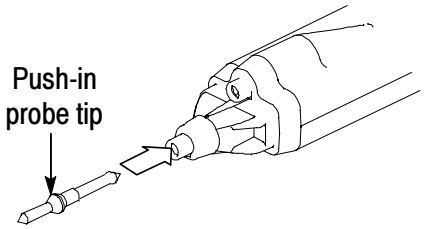
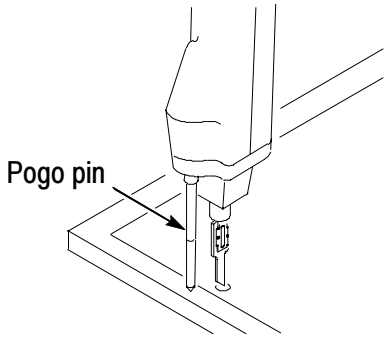
Feature/Accessory	Description
	**Push-in probe tip.** Use the push-in probe tip for general purpose probing by hand. The push-in probe tip may also be used with the other socketed leads and adapters. Tektronix part number: 131-5638-11 (1 set of 10)
	**Installing the push-in probe tip.** Attach the push-in probe tip by aligning the tip into the probe tip socket and pushing the tip in until it is seated. Either end of the tip may be used. Do not force the tip. Also, be careful not to poke yourself with the sharp probe tip. To remove the tip, gently grab the tip with small pliers, and pull the tip out.
	**Low-inductance ground pogo pin.** Use the low-inductance ground pogo pin to substantially reduce ground lead inductance. Because the pogo pin only touches the ground reference, you can easily move the probe to different points on the circuit under test. To attach, press the pogo pin into the probe head ground socket. To maintain signal fidelity while probing, use as short a ground path as possible. Refer to page 21 for more grounding information. Tektronix part number: 016-1772-10 (1 set of 10)

Table 1: P7225 features and standard accessories (Cont.)

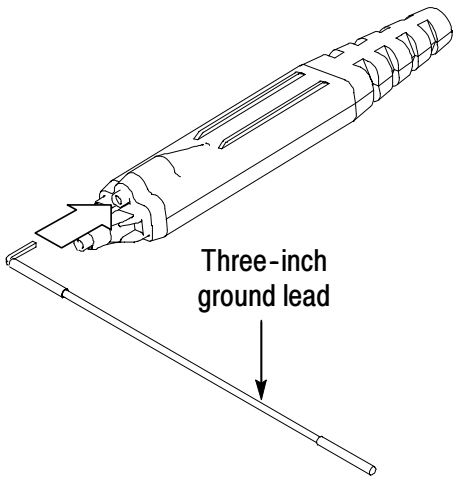
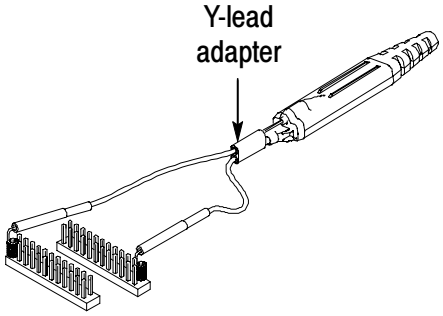
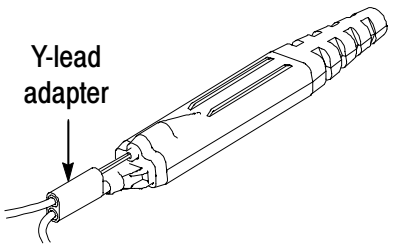
Feature/Accessory	Description
	**Three-inch ground lead.** Use the three-inch ground lead for general probing. The socketed end of the lead may be connected to any of the probe tips and adapters or fitted onto 0.025 inch square pins. To attach the ground lead, press and rotate the lead pin connector into the ground socket on the probe head. The lead may be removed by pulling the pin out by hand. To maintain signal fidelity while probing, use as short a ground path as possible. Refer to page 21 for more grounding information.
 	**Y-lead adapter.** Use the Y-lead adapter to extend the physical reach of the probe and ground when necessary. The Y-lead adapter accepts any of the probe tips or adapters, and can be pushed directly onto 0.025 inch square pins. When selecting the grounding connection, maintain as short a ground path as possible. Refer to page 21 for more information. Tektronix part number 196-3456-XX (1 set includes 3 three inch ground leads and 2 Y-lead adapters) To attach the Y-lead adapter, gently press the lead pins into the probe head tip and ground receptacles. Using the black lead for ground is recommended.

Table 1: P7225 features and standard accessories (Cont.)

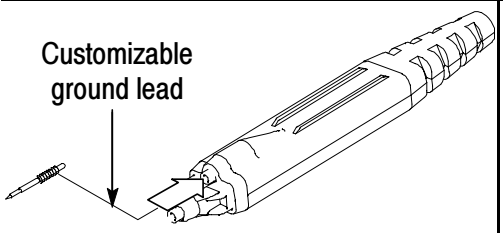
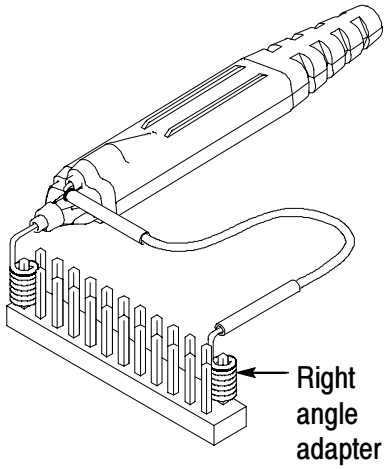
Feature/Accessory	Description
	**Customizable ground lead.** You can bend or shorten this ground lead wire. **NOTE**: To ease insertion into the ground socket of the probe, cut the tip of this ground lead wire at a 30 to 60 degree angle. To maintain signal fidelity while probing, use as short a ground path as possible. Refer to page 21 for more grounding information. Tektronix part number: 196-3482-XX (pkg of 5)
	**Adapter spring.** Use the adapter spring for low-profile probing of 0.025 inch square pins. The adapter spring allows the probe to lie at a right-angle (flat against a circuit board). This enables probing in vertical circuits, such as computer or communications backplanes, or in tight areas, such as between circuit cards. The adapter can be used directly with the probe head or attached to a Y-lead adapter or ground lead. The adapter is attached by pushing the tip into the probe tip socket until it is seated. The adapter spring can be easily removed by hand. Tektronix part number: 016-1774-XX (pkg of 10)

Table 1: P7225 features and standard accessories (Cont.)

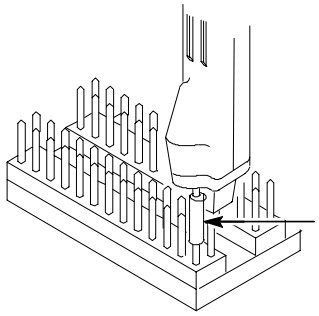
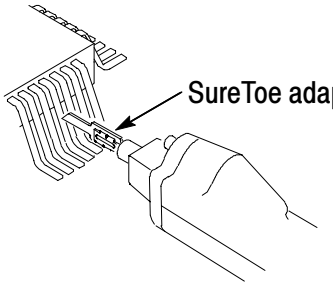
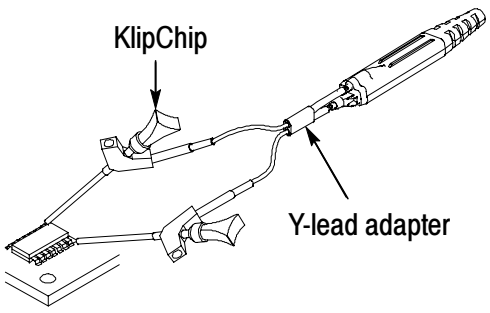
Feature/Accessory	Description
	**Square pin socket.** The square pin socket is ideal for use with signal/ground pairs on 0.100 inch squareheader pins. Attach the socket by gently pressing it into the ground socket on the probe head. Be sure to use the stabilization notch whenever possible to avoid slipping and damaging the probe or circuitry under test. Tektronix part number: 016-1773-10 (pkg of 10)
	**SureToe probe adapter (4 ea).** The SureToe adapter is a pointed probe tip useful for probing in dense circuitry. Attach the SureToe adapters the same way as the push-in probe tips. Do not force the adapter. Also, be careful not to poke yourself with the sharp probe tip. SureToe adapters can be used with any of the socketed accessory leads. Tektronix part number: ST501 (pkg of 12)
	**SMT KlipChip.** Use the SMT KlipChip test clips to access fragile, dense circuitry. You can connect the KlipChip test clips to a Y-lead or three-inch ground leads. To connect, press the lead socket into the KlipChip handle. The KlipChip body turns freely, allowing better probe orientation. To reduce stress and provide a lower profile on components being tested, the flexible sleeve of the KlipChip bends up to a 35 degree angle. Tektronix part number: 206-0364-XX (2 each)

Table 1: P7225 features and standard accessories (Cont.)

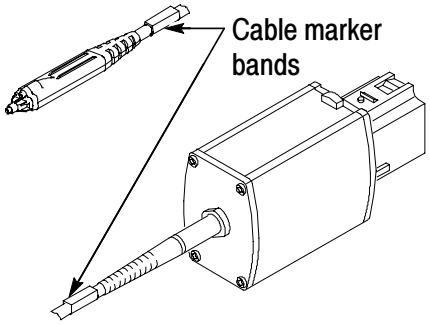
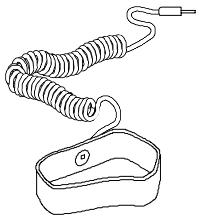
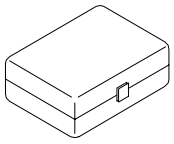
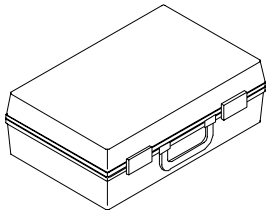
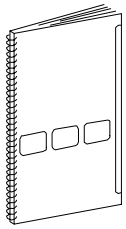
Feature/Accessory	Description
	**Cable marker bands.** Attach matching pairs of the marker bands onto the cable at the head and compensation box of each probe. The marker bands enable quick verification of which probe is connected to which instrument channel. Tektronix part number: 016-1315-XX (pkg of 10)
	**Antistatic wrist strap.** When using the probe, always work at an antistatic work station and wear the antistatic wrist strap. Tektronix part number: 006-3415-XX
	**Plastic accessory box.** Use the plastic box to store the probe accessories when not in use. Tektronix part number: 006-7164-XX
	**Instrument case.** The instrument case protects the probe from harsh environments. Tektronix part number: 016-1879-XX
	**User Manual.** Provides specifications and instructions for operating the probe, and a list of accessories and adapters. Tektronix part number: 071-1187-XX

Table 1: P7225 features and standard accessories (Cont.)

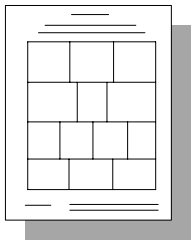
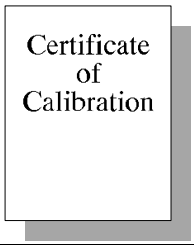
Feature/Accessory	Description
	**Accessory reorder sheet.** Use the accessory reorder sheet as a quick guide for ordering accessories for your probe. The sheet provides photos and part numbers for identifying your accessories. Tektronix part number 001-1258-XX
	**Calibration certificate.** A certificate of traceable calibration is provided with every instrument shipped.

Table 2 lists the optional accessories you can order for your P7225 probe.

Table 2: P7225 optional accessories

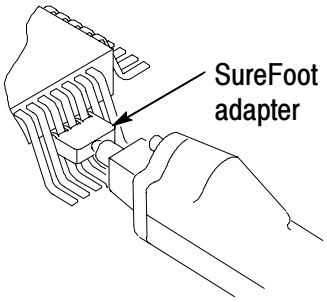
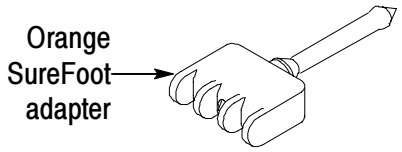
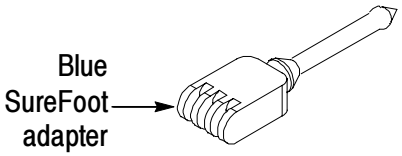
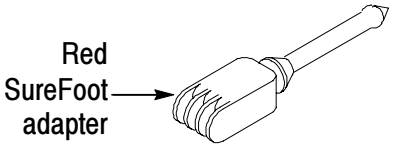
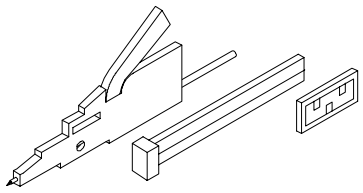
Accessory	Description
	**SureFoot probe adapter.** The SureFoot adapter is an integral probe tip and miniature guide that enables fault-free probing of fine-pitch SMD packages. Attach SureFoot adapters the same way as the push-in probe tips. Three models of SureFoot adapters are available for the probe and can be used with any of the socketed accessory leads.
	**SF501.** The orange SureFoot adapter is compatible with 50 mil JEDEC packages, such as SOIC, PLCC, CLCC, and so on. Tektronix part number: SF501 (pkg of 12)
	**SF502.** The blue SureFoot adapter is compatible with 0.25 mil JEDEC and EIAJ packages. Tektronix part number: SF502 (pkg of 12)
	**SF503.** The red SureFoot adapter is compatible with 0.05 mm EIAJ packages. Tektronix part number: SF503 (pkg of 12)
	**Micro KlipChip adapters.** Use the adapters to probe the leads on integrated circuits that are surface mounted. Tektronix part number: SMK4 (pkg of 4)

Table 2: P7225 optional accessories (Cont.)

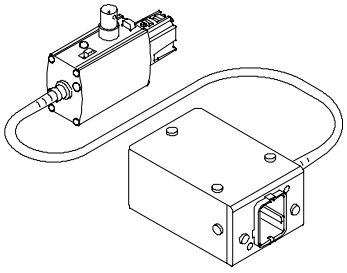
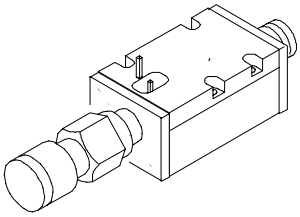
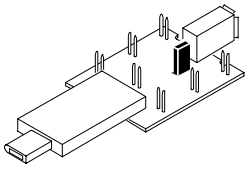
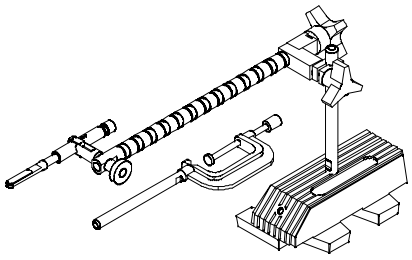
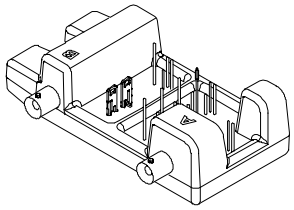
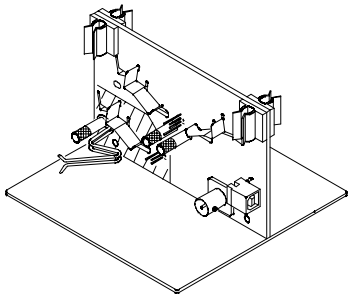
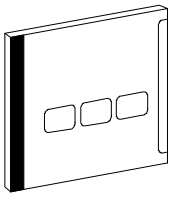
Accessory	Description
	**TekConnect Interface calibration fixture.** The calibration fixture is required when a performance verification or adjustment is done on the probe. It provides connectors and test points for internal probe measurements. Tektronix part number: 067-0422-XX
	**SMA-to-probe tip adapter.** Use the adapter to connect the probe to SMA cables and for calibration and performance verification. The adapter includes a 50-ohm SMA terminator. Tektronix part number: 015-0678-XX
	**IEEE1394 Adapter.** The IEEE1394 Adapter allows you to probe signals on the bus, external to system enclosures, without disturbing system operation. The adapter maintains a balanced 50-ohm signal path and can be used in both single-ended and differential modes. Tektronix part number: 679-5027-XX
	**PPM100 Probe Positioner.** The PPM100 is a general purpose bench top probe holder with flexible arm, designed for hands-free probing and fine positioning adjustments. The heavy duty base can be replaced with the clamp for securing the probe arm in a variety of situations. Use flexible retention rings to attach the probe to the probe holder. Tektronix part number: PPM100

Table 2: P7225 optional accessories (Cont.)

Accessory	Description
	**Probe Calibration and Deskew Fixture.** This fixture provides an edge source to time align (deskew) and to optimize host instrument gain and offset accuracy at the probe tip. Tektronix part number: 067-0405-XX
	**Deskew Fixture.** This fixture provides an edge source to time align (deskew) and to optimize host instrument gain and offset accuracy at the probe tip. The probes are held in place allowing hands-free operation without requiring a probe arm. Tektronix part number: 067-0484-XX
	**Calibration software and instructions.** Use the Optional Applications Software CD that is shipped with host instruments featuring the TekConnect interface. Alternatively, you can download the software from the Tektronix website, or order the CD using the part number below. Tektronix part number: 063-3376-XX

Functional Check

A functional check may be performed using the PROBE COMPENSATION connections on the front panel of the host instrument. See Figure 3.

***NOTE**. If you are not familiar with the operation of the host instrument, please refer to the user manual for the host instrument.*

Figure 3 illustrates the probe compensation connection for TDS6000 and TDS7000 instruments. Your instrument may differ from Figure 3. Please refer to your host instrument for the exact location of the probe compensation connection.

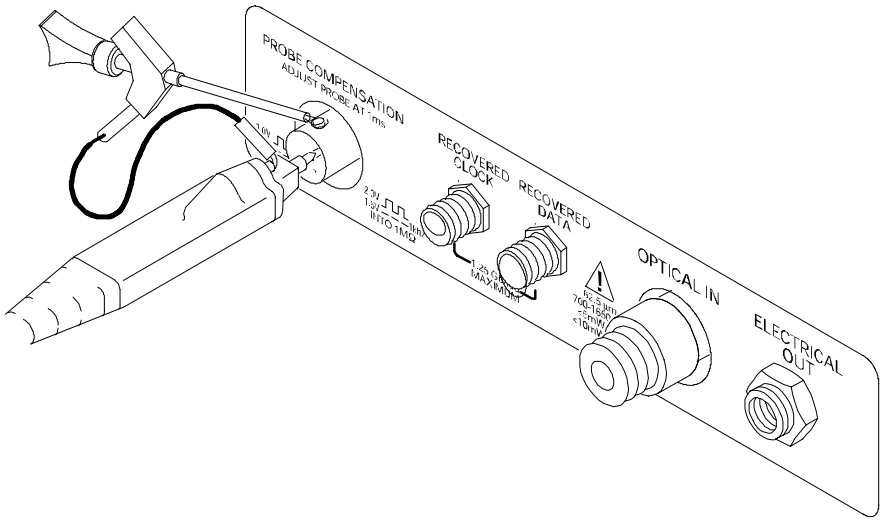


Figure 3: Probe functional check connections

1. Connect the probe to a channel on the TekConnect host instrument.
2. Set the host instrument to display the probe channel.

3. Using a ground lead and SMT KlipChip, connect the probe ground to the instrument ground on the host instrument.
4. Using a standard tip, hold the probe to the center conductor of the PROBE COMPENSATION output on the host instrument.
5. Press **AUTOSET**, or adjust the host instrument to display a stable calibration waveform. (You may need to adjust the probe offset to display the waveform.)

NOTE. *Now is a good time to perform a probe calibration routine from your instrument. Refer to the online help of your host instrument for calibration routine procedures.*

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6. Disconnect the probe tip from the host instrument, and ground the probe tip. (Connect the KlipChip to the probe tip.)
7. Set the probe offset to 0.0 V to make the host instrument display at the ground reference.
8. Adjust the V/div to keep the waveform on the screen.

Configuration

The P7225 provides the host instrument with the probe model number, serial number, and attenuation factor. When connected to a host instrument with a TekConnect Interface, display readouts are corrected for the probe attenuation factor, the instrument input is set to 50 Ω, and the coupling is set to DC. The probe offset control is controlled by the host instrument.

Probe Offset

The probe offset is adjustable to permit operation within the linear range of the probe. Using the offset to cancel DC signal components enables optimal probe performance. See Figure 4 on page 18 for more information.

NOTE. *See your host instrument manual for specific instructions on its operation and offset control.*

To set the probe offset, follow these steps:

1. Ground the input of the probe.

NOTE. *The probe must be terminated with low impedence (<100 Ω) to correctly display offset voltage.*

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2. Use the vertical position control to set a zero reference level on the host instrument display.
3. Set the host instrument to 1 V/div.
4. Attach the probe to the circuit.
5. Adjust the probe offset to bring the trace to the host instrument zero reference.

6. Change the volts/division setting to the desired range, adjusting the offset to keep the trace on the zero reference level.

***NOTE**. The* P7225 *has a ±10.0 V offset range. The input voltage linear operating range is ±4 V. See Figure 4.*

If cursors are used on a TekConnect Interface host instrument, the zero reference will be at the probe offset voltage.

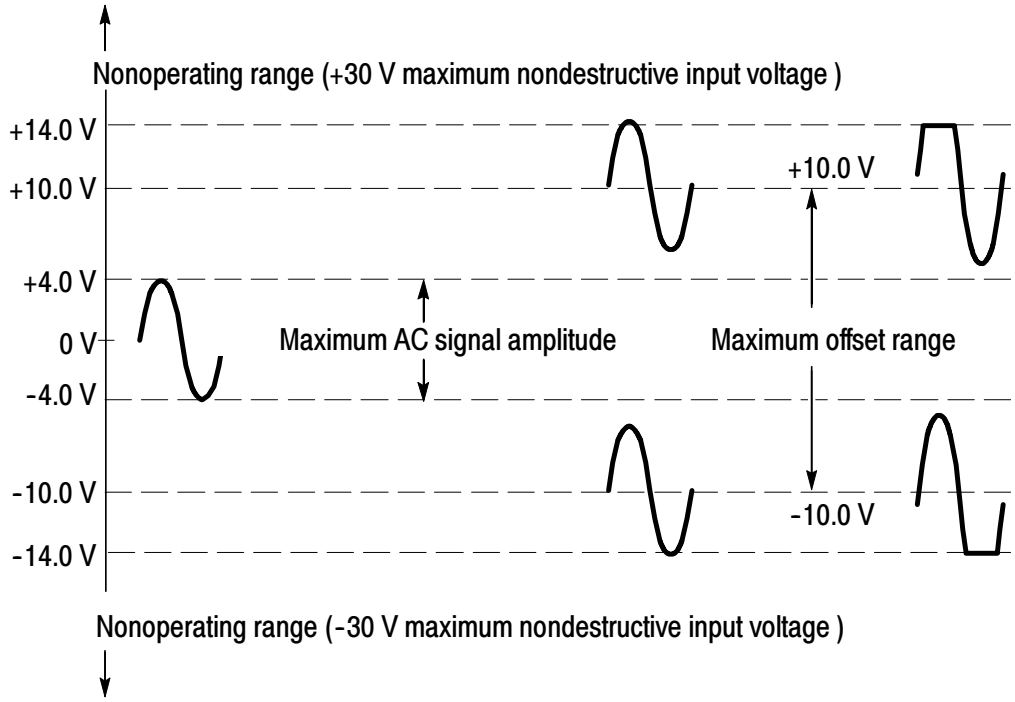

Figure 4: Dynamic and offset limitations

Operating Basics

Please follow these operating guidelines to get optimum performance from your P7225 probe.

Handling the Probe

Exercise care when using and storing the P7225. The probe and cable are susceptible to damage caused by careless use. Always handle the probe using the compensation box and probe head, avoiding undue physical strain to the probe cable.

***NOTE**. To reduce the likelihood of creating signal aberrations, be careful not to dent, kink, pull or stretch the cable.*

***CAUTION.** To prevent damage to the probe, do not drop the probe or subject it to physical shock.*

Maximum Nondestructive Input Voltage

***CAUTION.** To avoid damage to the probe tip amplifier, do not apply voltages above the maximum non-destructive input voltage.*

Refer to *Specifications* on page 29 for the maximum operating voltage and frequency derating information.

Input Linear Dynamic Range

The probe head amplifier used by the P7225 has a limited linear operating range. The usable dynamic range is ±4.0 V however, to keep the input linearity error less than ±0.1%, you must limit the apparent signal input voltage to ±3.75 V. If you use the full signal input voltage of ±4.0 V, then the input linearity error increases to ±1.0%.

Use the DC offset adjustment to maintain the probe within the dynamic range. The nominal offset adjustment range of the P7225 is ±10.0 V.

***NOTE**. The probe can tolerate input voltages of ±30 V without damage; however, the linearity error specification does not apply to input voltages exceeding ±14.0 V (including any DC offset). See Figure 4 on page 18.*

Electrical Effects of Adapters

The probe tip adapters included with your probe help connect to different types of components. While these adapters make connections easier, be aware that the adapter you choose may affect the signal that you are measuring, depending on a variety of factors, including signal frequency, source impedance, and lead length.

Use the probe without adapters to optimize step and frequency response. Using the probe tip adapters adds inductance and capacitance, which increase step response and aberrations, and leads to increased ripples in frequency response. These effects increase as the source impedance increases and measured waveform risetimes decrease.

Figure 5 on page 21 illustrates the typical effects on a given signal using some of the adapters included with your probe.

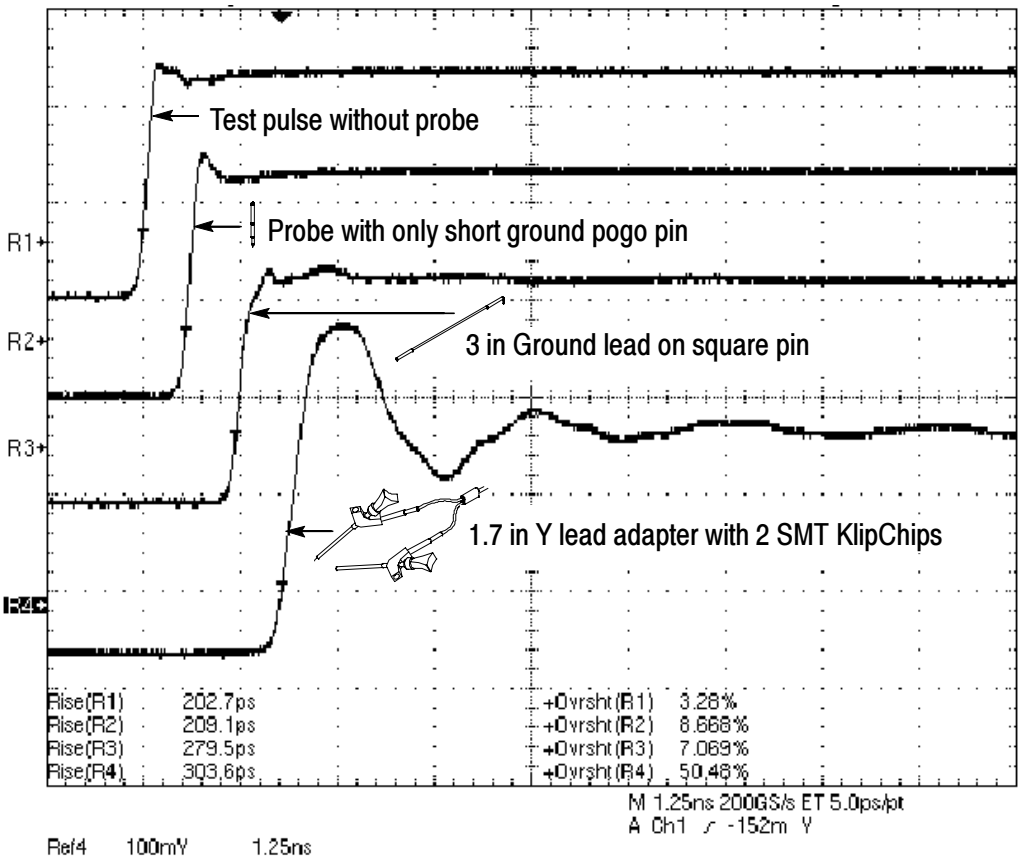

Figure 5: Typical effects of using a probe tip adapter

Ground Lead Length

When you are probing a circuit, always use as short a ground lead as possible between the probe head and circuit ground.

The series inductance added by the probe tip and ground lead can result in a resonant circuit; this circuit may cause parasitic ringing within the bandwidth of your host instrument. Refer to Figure 6.

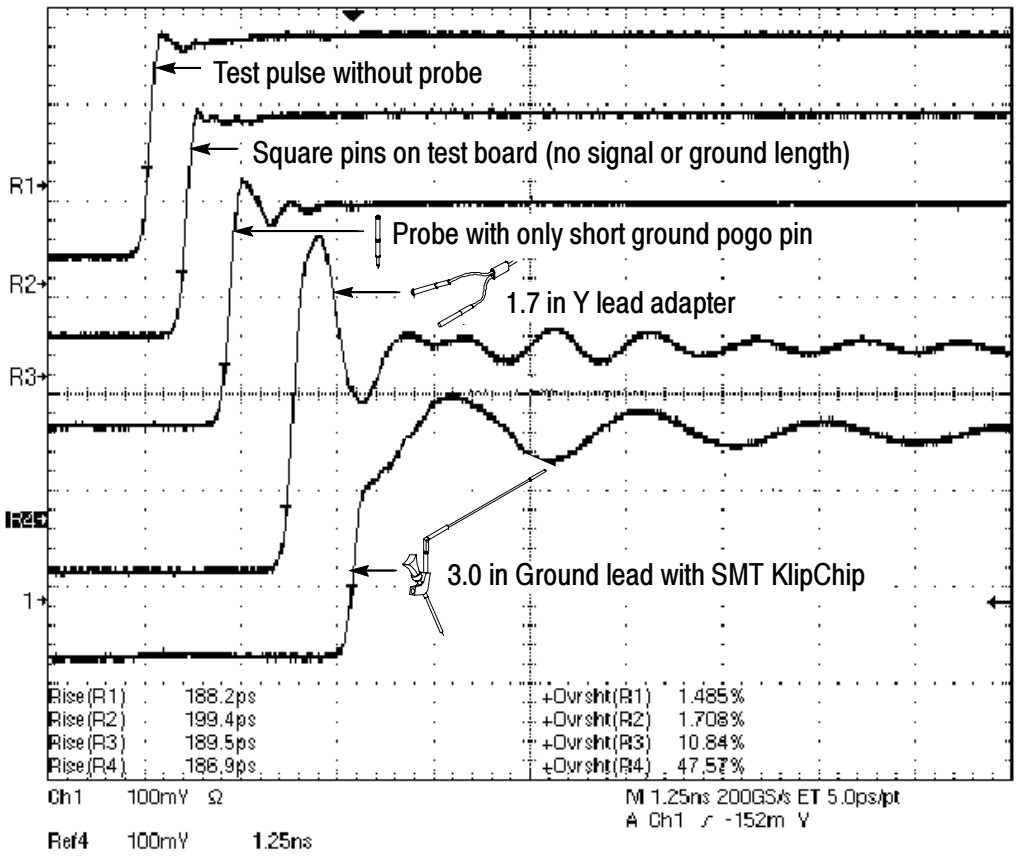

Figure 6: Waveform distortion from ground lead length

Ground Lead Inductance

When you touch your probe tip to a circuit element, you are introducing a new resistance, capacitance, and inductance into the circuit. Refer to Figure 7 on page 23.

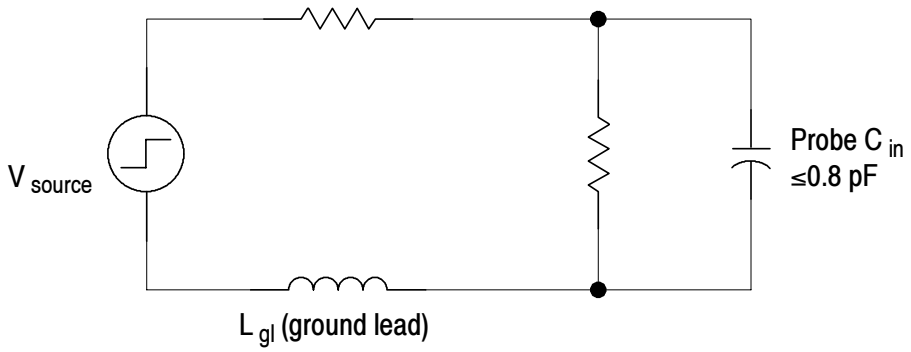

Figure 7: Ground lead equivalent circuit

Ringing and rise time degradation can be masked if the frequency content of the signal degradation is beyond the bandwidth of the host instrument.

You can determine if ground lead effects may be a problem in your application if you know the self-inductance (L) and capacitance (C) of your probe and ground lead. Calculate the approximate resonant frequency (f_0) at which this parasitic circuit will resonate with the following formula:

$$f_0 = \frac{1}{2\pi\sqrt{LC}}$$

The preceding equation shows that reducing the ground lead inductance will raise the resonant frequency. If your measurements are affected by ringing, lower the inductance of your ground path until the resulting resonant frequency is well above the frequency of your measurements.

The low-inductance ground pogo pin described in *Features and Accessories* starting on page 5 can help you reduce the effects of ground lead inductance on your measurements.

Helpful Hints

Follow these helpful hints to make probing easier and noise free.

Low-inductance Grounding

Placing a ground plane on top of the IC package being probed can minimize ground lead length and inductance. See Figure 8.

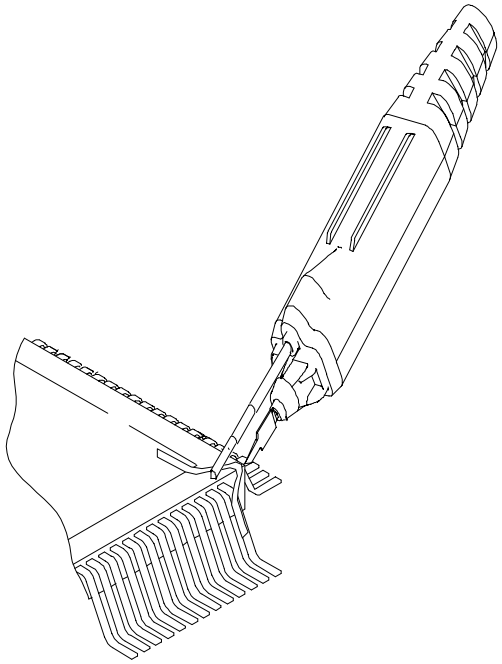

Figure 8: Low-inductance grounding

Attach a small piece of copper clad wire on top of the IC package and connect it to the IC package ground connection. Use the low-inductance ground pogo pin or the customizable ground lead to keep the ground lead length as short as possible.

This method is very useful when making many measurements on the same package. Using a ground plane on the IC package makes probing the IC package easier and avoids adding unnecessary ground lead length and distortion.

SureFoot Grounding

If you cannot use the recommended low-inductance grounding method, you may ground the probe to the IC package under test using a SureFoot adapter. Refer to Figure 9.

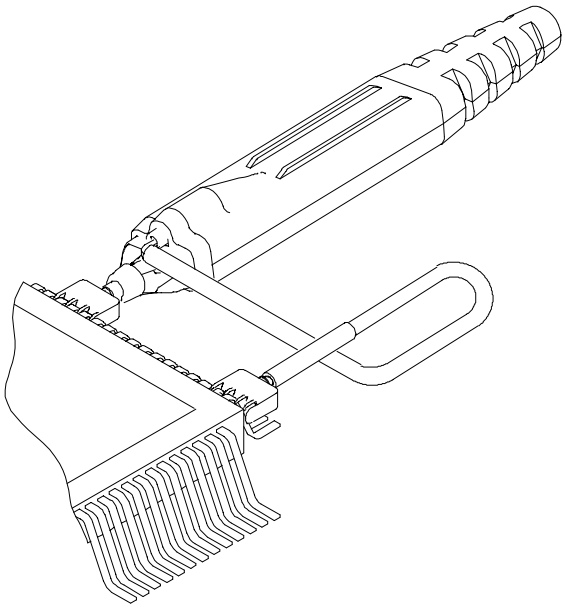

Figure 9: Using a SureFoot adapter for grounding

Use a SureFoot adapter at the end of a short ground lead to connect directly to the IC package ground. This method is preferred over using an adjacent circuit ground because it is the shortest ground path possible.

Probe Tip Test Points

You can solder the push-in probe tip or a 0.025 inch square pin to a circuit, to be used as a temporary test point. See Figure 10.

Solder the push-in probe tip onto a lead or pin with a low-power soldering iron. Press the probe head onto the push-in probe tip to make a measurement. Pull the probe head off of the push-in probe tip when you are done.

You can remove and reuse the push-in probe tip by desoldering it from the circuit, and soldering it into another circuit in the future.

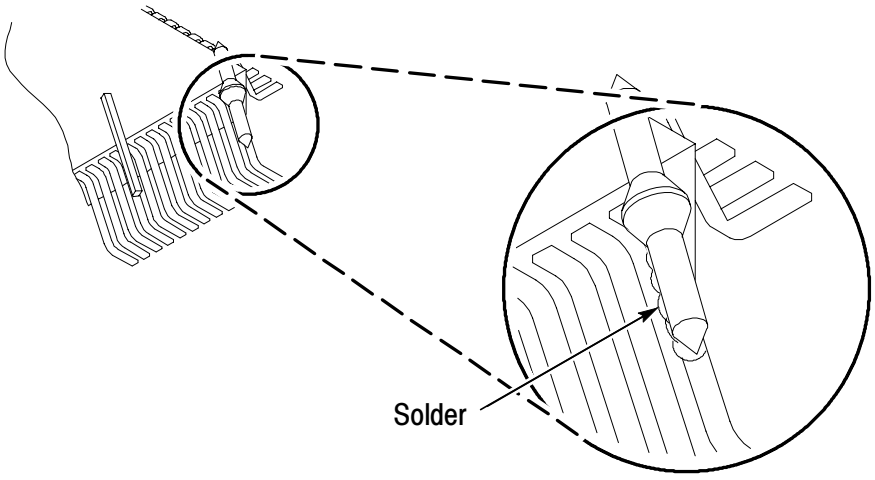

Figure 10: Using a push-in probe tip as a test point

***NOTE**. Do not use pieces of solid-core copper wire as test points. If the wire breaks off in the probe tip socket, it may be impossible to remove the wire, and it will prevent insertion of other accessory tips.*

Appendix A: Specifications

The probe and host instrument must first be allowed to warm up for 20 minutes before measurements are taken.

Specifications

CAUTION. *To prevent damage to the probe or circuit under test, do not apply voltages beyond the nondestructive input voltage range to the probe.*

Table 3: Warranted electrical specifications

Output Zero	±10 mV or less at output of probe
Rise Time (probe only)	≤140 ps
DC Gain Accuracy (probe only)	0.1 ±2% (excludes offset error)

Table 4: Typical electrical characteristics

Bandwidth, (probe only)	2.5 GHz (See Figure 12)
Linear Input Dynamic Range	-4.0 V to +4.0 V (Equivalent to -400 mV to +400 mV at the output of the probe.)
Delay Time	5.3 ns ±0.2 ns
Offset Range	-10.0 V to +10.0 V
System Noise	300 μV_{rms} or less at output of probe with probe tip grounded

Table 4: Typical electrical characteristics (Cont.)

Linearity	± 0.1% over a dynamic range of -3.75 V to + 3.75 V ± 1.0% over a dynamic range of -4.0 V to + 4.0 V
Nondestructive Input Voltage Range	-30 V to +30 V (DC + peak AC)
Input Resistance	40 kΩ (See Figure 11 for impedance vs. frequency)
Input Capacitance	≤0.8 pF
DC Offset Drift	150 μV/°C or less at output of probe 0.75 mV/°C or less displayed on screen with TekConnect Interface
DC Offset Scale Accuracy	±2% (of 10x actual probe gain)
DC Voltage Measurement Accuracy, referred to input	±(2% of input + (2% of offset) + 100 mV output offset + 80 mV linearity error)

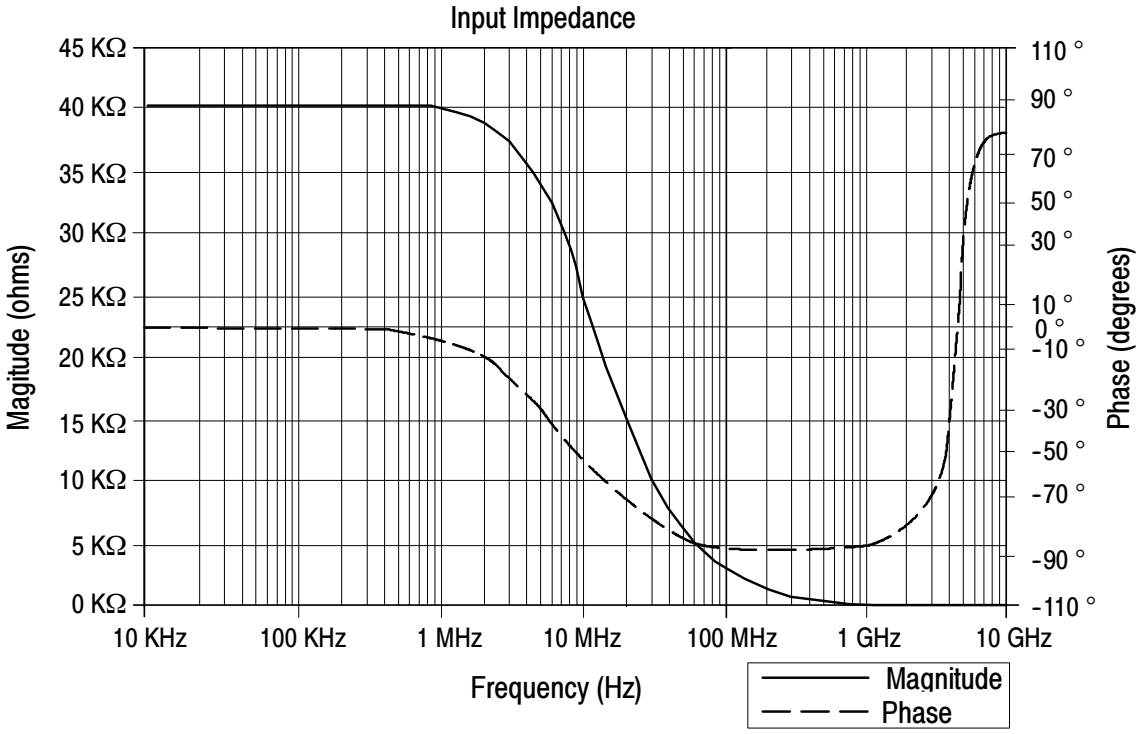

Figure 11: Typical input impedance and phase versus frequency

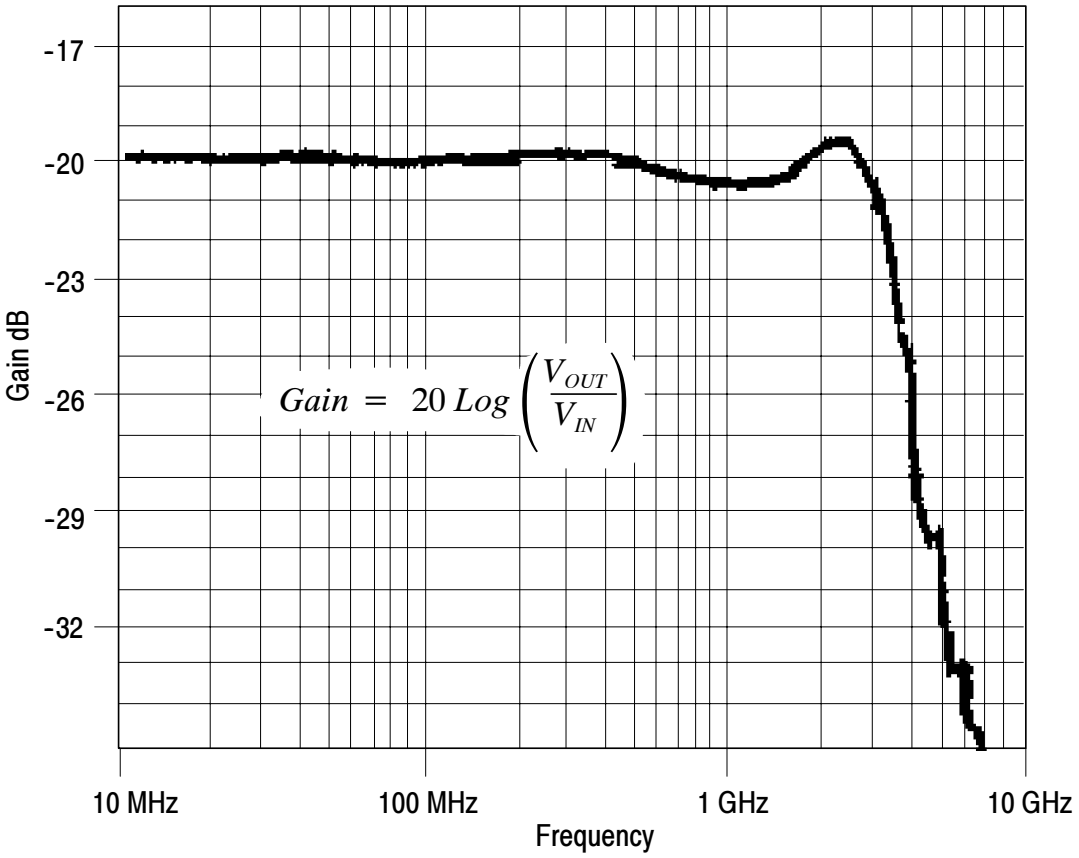

Figure 12: Typical bandwidth

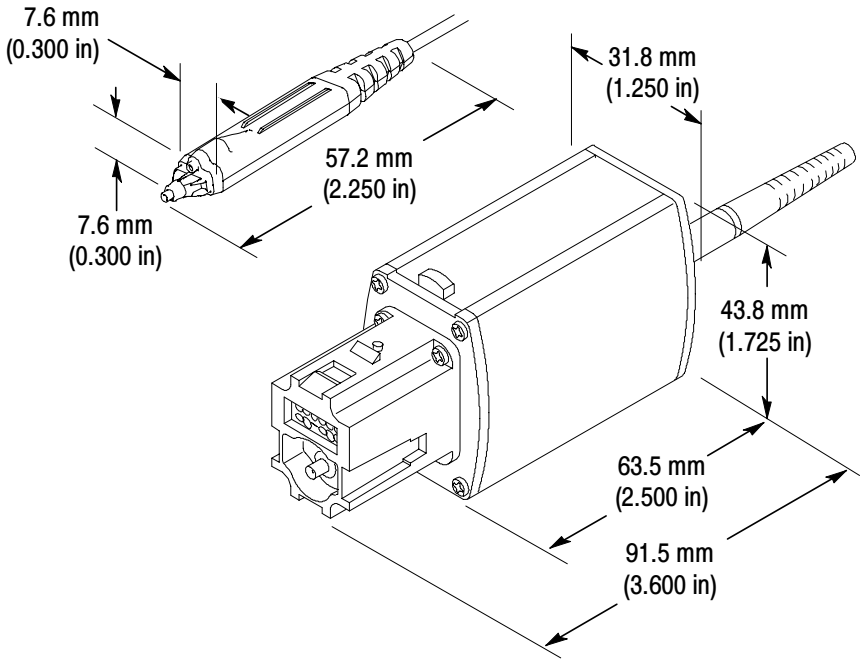

Figure 13: Probe head and compensation box dimensions

Table 5: Physical characteristics

Net weight	1.41 kg (3.1 lbs)
Cable length	1.3 m (50 in)

Table 6: Environmental characteristics

Operating temperature	0 °C to +40 °C (+32 °F to +104 °F)
Nonoperating temperature	-55 °C to +75 °C (-67 °F to +167 °F)
Humidity	0 to 90% RH at +30 °C to +40 °C (+86 °F to +104 °F)
Packaged product vibration and shock	The packaged product qualifies under the Distribution Cycle 1 Assurance Level II for packaged products 0 to 20 lbs. Test 2 for Warehouse and Vehicle Stacking (Compression) is omitted.

Table 7: Certifications and compliances

Category	Standards or description
EMC compliance	This product has been reviewed to the conditions and provisions of Directive 89/336EEC for products of the EN61326 product family and determined to be exempt from the EMC directive.

Appendix B: User Service

This section explains the maintenance for the P7225 probe.

Inspection and Cleaning

CAUTION. *To prevent damage to probe materials, do not use chemicals that contain benzine, benzene, toluene, xylene, acetone, or similar solvents.*

Do not immerse the probe or use abrasive cleaners.

Dirt may be removed with a soft cloth dampened with a 75% isopropyl alcohol and water solution.

Calibration

If you need to do a performance verification or make internal adjustments to your probe, refer to the *P7225 2.5 GHz Active Probe Service Manual.* The manual is a printable pdf file, and is available on both the Tektronix website and the Optional Applications CD. The Optional Applications CD is included with Tektronix oscilloscopes and signal analyzers featuring the TekConnect interface.

Replacement Parts

Refer to the *Replaceable Parts* section for a list of customer replacement parts. Due to the sophisticated design of the P7225 probe, there are no user replaceable parts within the probe.

Preparation for Shipment

If the original packaging is unfit for use or not available, use the following packaging guidelines:

1. Use a corrugated cardboard shipping carton having inside dimensions at least one inch greater than the probe dimensions. The box must have a carton test strength of at least 200 pounds (90.72 kg).
2. Put the probe into an antistatic bag or wrap to protect it from dampness.
3. Place the probe into the box and stabilize it with light packing material.
4. Seal the carton with shipping tape.

Appendix C: Replaceable Parts

This section contains a list of replaceable parts for the P7225 probe. Use this list to identify and order replacement parts.

Parts Ordering Information

Replacement parts are available from or through your local Tektronix, Inc. service center or representative.

Changes to Tektronix instruments are sometimes made to accommodate improved components as they become available and to give you the benefit of the latest circuit improvements. Therefore, when ordering parts, it is important to include the following information in your order:

- Part number
- Instrument type or model number
- Instrument serial number
- Instrument modification number, if applicable

If a part you order has been replaced with a different or improved part, your local Tektronix service center or representative will contact you concerning any change in the part number.

Using the Replaceable Parts List

The tabular information in the Replaceable Parts List is arranged for quick retrieval. Understanding the structure and features of the list will help you find the information you need for ordering replacement parts.

Item Names

In the Replaceable Parts List, an Item Name is separated from the description by a colon (:). Because of space limitations, an Item Name may sometimes appear as incomplete. For further Item Name identification, U.S. Federal Cataloging Handbook H6-1 can be used where possible.

Indentation System

This parts list is indented to show the relationship between items. The following example is of the indentation system used in the Description column:

1 2 3 4 5 Name & Description
Assembly and/or Component
Attaching parts for Assembly and/or Component
(END ATTACHING PARTS)
Detail Part of Assembly and/or Component
Attaching parts for Detail Part
(END ATTACHING PARTS)
Parts of Detail Part
Attaching parts for Parts of Detail Part
(END ATTACHING PARTS)

Attaching parts always appear at the same indentation as the item it mounts, while the detail parts are indented to the right. Indented items are part of, and included with, the next higher indentation. Attaching parts must be purchased separately, unless otherwise specified.

Abbreviations

Abbreviations conform to American National Standards Institute (ANSI) standard Y1.1

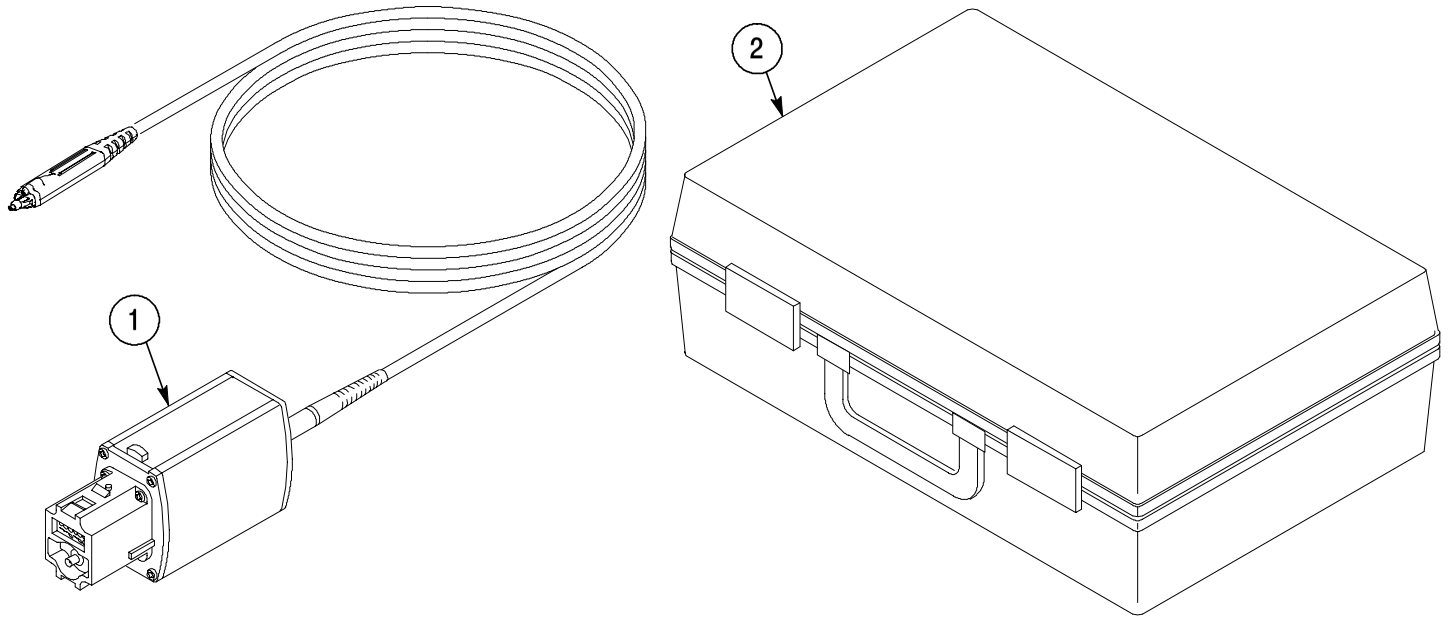

Figure 14: P7225 replaceable parts

Fig. & index no.	Tektronix part no.	Serial no. Effective	Dscont	Qty	12345 name & description	Mfr. code	Mfr. part no.
14-1	010-0694-XX			1	PROBE, FET ACT:2.5 GHZ,10X, ≤0.8 PF,TDS SERIES	80009	010-0694-XX
-2	016-1879-XX			1	CASE,STORAGE:PLASTIC,W/FOAM	TK6108	016–1879–XX

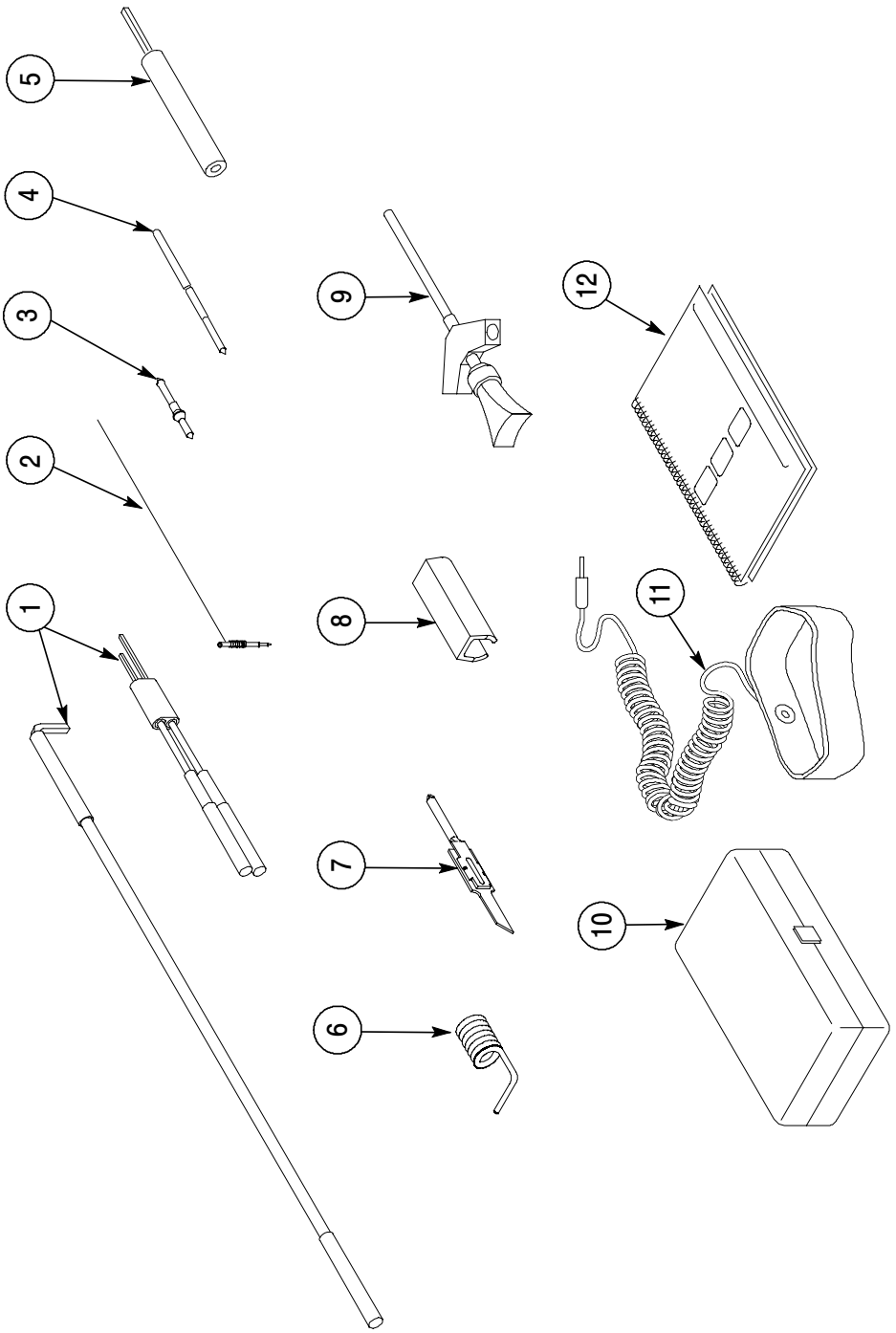

Figure 15: P7225 standard accessories

Fig. & index no.	Tektronix part no.	Serial no. Effective	Serial no. Dscont	Qty	12345 name & description	Mfr. code	Mfr. part no.
					STANDARD ACCESSORIES		
15-1	196-3456-XX			1	LEAD SET; ACCESSORY KIT	060D9	196-3456-XX
-2	196-3482-XX			1	CUSTOMIZABLE GROUND LEAD SET, SET OF 5	060D9	87139000
-3	131-5638-11			1	PROBE,TIP:PACKAGE OF 10	80009	131-5638-11
-4	016-1772-10			1	ACCESSORY KIT:POGO PIN,PKG OF 10	060D9	016-1772-10
-5	016-1773-10			1	ACCESSORY KIT:GND PIN LENGTH ADAPTER,PKG OF 10	060D9	016-1773-10
-6	016-1774-XX			1	ACCESSORY KIT:ADAPTER SPRING,PKG OF 10	060D9	016-1774-XX
-7	----------			1	PROBE,TIP,SURETOE:PACKAGE OF 4 (REORDER ST501, PKG OF 12)	060D9	----------
-8	016-1315-XX			1	MARKER KIT,ID:CABLE MARKER BAND,2 EA, VAR COLRS	7X318	1134
-9	206-0364-XX			2	TIP,PROBE:MICROCKT TEST,SMT KLIP CHIP	80009	206-0364-XX
-10	006-7164-XX			1	BOX,PLASTIC:4.625 X 2.875 X 1.0	53718	K226
-11	006-3415-XX			1	STRAP,WRIST:3M TYPE 2214, ADJUSTABLE,6 FT COILED CORD	TK0623	3M TYPE 2064
-12	071-1187-XX			1	MANUAL,TECH:USER, P7225	TK2548	071-1187-XX

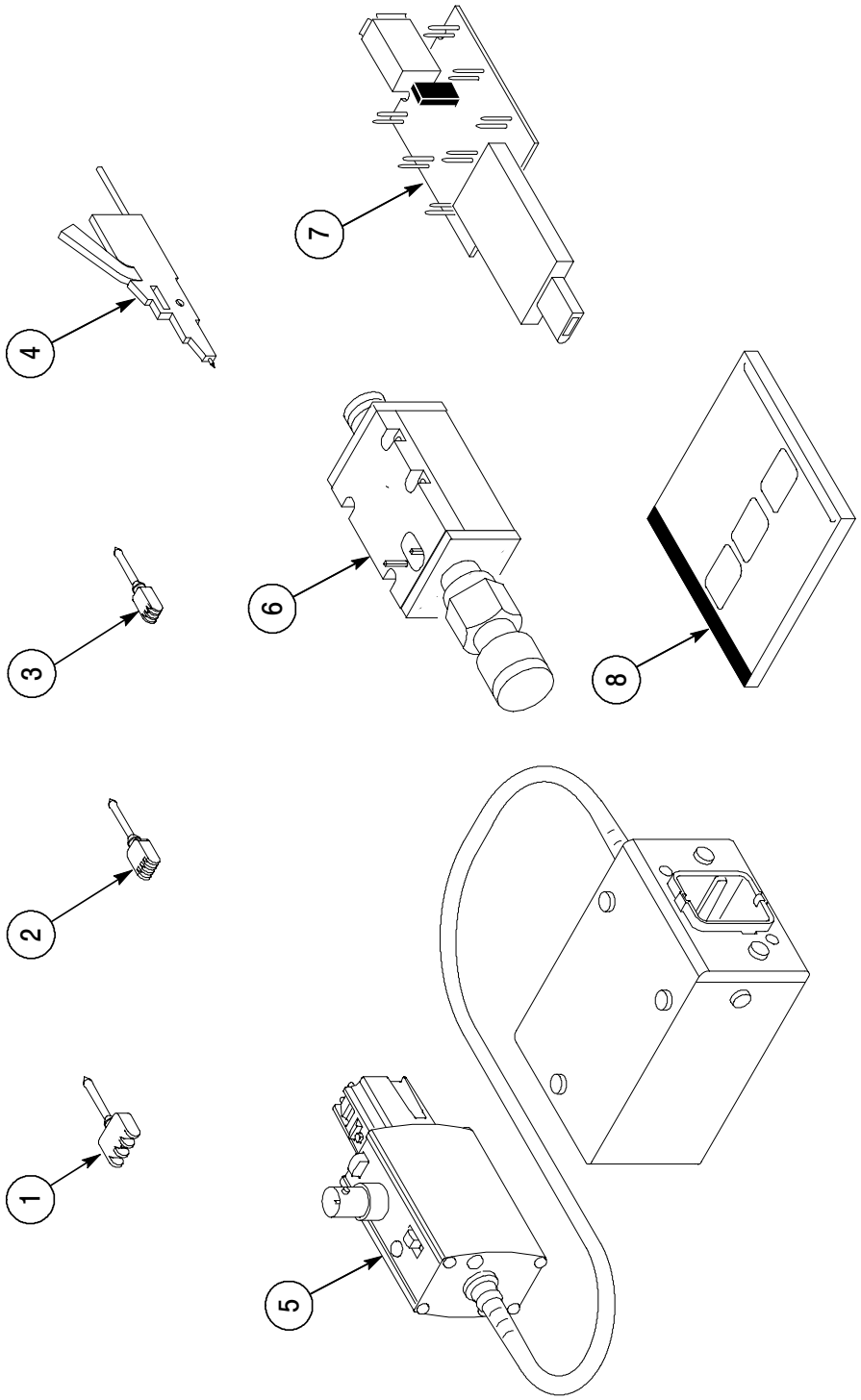

Figure 16: P7225 optional accessories

Fig. & index no.	Tektronix part no.	Serial no. Effective	Dscont	Qty	12345 name & description	Mfr. code	Mfr. part no.
					OPTIONAL ACCESSORIES		
16-1	SF501			1	ADPTR,SUREFOOT:50 MIL JEDEC,PKG OF 12	060D9	SF501
-2	SF502			1	ADPTR,SUREFOOT:25 MIL JEDEC,PKG OF 12	060D9	SF502
-3	SF503			1	ADPTR,SUREFOOT:0.5 MM EIAJ,PKG OF 12	060D9	SF503
-4	SMK4			1	TIP,PROBE:MICROCKT TEST,PKG OF 4	0HHL8	SMK4
-5	067-0422-XX			1	CALIBRATION FIXTURE ASSY:ECB TO TOP,P7000 SERIES	80009	067-0422-XX
-6	015-0678-XX			1	ADAPTER, PROBE:TIP,SMA 2 COMPACT SIZE,TERMINATED INTO 50 OHM TEST FIXTURE	64537	JA-121S
-7	679-5027-XX			1	CKT BD SUBASSY:1394 ADAPTER	80009	679-5027-XX
-8	063-3376-XX			1	SOFTWARE PKG:OPTIONAL APPLICATIONS SOFTWARE,CD-ROM,TDS7000 SERIES	TK2548	063-3376-XX

CROSS INDEX - MFR. CODE NUMBER TO MANUFACTURER

Mfr. code	Manufacturer	Address	City, State, Zip code
80009	TEKTRONIX INC	14150 SW KARL BRAUN DR PO BOX 500	BEAVERTON OR 97077-0001
060D9	TENSOLITE COMPANY	PRECISION HARNESS AND ASSEMBLY~3000 COLUMBIA HOUSE BLVD~#120	VANCOUVER, WA 98661
0HHL8	EMULATION TECHNOLOGY INC	2344 WALSH AVE, BLDG F	SANTA CLARA, CA 95051
53718	FLAMBEAU AIRMOLD CORP	100 GRACE DRIVE~PO BOX 610	ROANOKE RAPIDS, NC 27870
7X318	KASO PLASTICS INC	5720-C NE 121ST AVE, STE 110	VANCOUVER, WA 98682
TK0623	GENERAL TOOL & SUPPLY CO	2705 NW NICOLAI ST	PORTLAND, OR 97210
TK2548	XEROX CORPORATION	14181 SW MILLIKAN WAY	BEAVERTON, OR 97005
TK2565	VISION PLASTICS INC	26000 SW PARKWAY CENTER DRIVE	WILSONVILLE, OR 97070
TK6108	KENT H LANDSBERG CO	27929 SW 95TH, SUITE 101	WILSONVILLE, OR 97070